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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/915,936	07/25/2001	Kouji Kurosaki	IIW-006	8248

959 7590 10/05/2004

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EXAMINER	
TSANG FOSTER, SUSY N	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/915,936	KUROSAKI ET AL.
	Examiner	Art Unit
	Susy N Tsang-Foster	1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment filed on 7/13/2004. Claims 1-7 have been amended and claims 8-10 have been added. Claims 1-10 are pending. Previous art rejections based on Scheffler et al., Komiya et al., and Okamoto et al. are withdrawn in view of applicant's certified translation of the foreign priority document. Previous art rejections based on JP 58-12268 are withdrawn in view of applicant's arguments. Previous art rejections based on by Fujitsuka (US 4,838,020) are withdraw after further consideration by the Examiner. Claims 1-10 are finally rejected for reasons of record and for reasons necessitated by applicant's amendment.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 10, the limitation "wherein a signal for controlling the pressure of the cathode gas is once slightly decreased at an initial stage of increasing the air flow amount and thereafter it is increased following an increase of the cathode gas flow amount" is not in the specification.

With respect to claim 10, it is unclear with respect to what reference point the signal for controlling the pressure of the cathode is once slightly decreased. There appears to be no mention in the specification of increasing or decreasing a signal for controlling the pressure of the cathode gas. Instead, Figure 5 of applicant's instant specification shows that the opening of the back pressure control valve is decreased initially at the beginning of the transition period and then gradually increased throughout the transition period.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 10, the limitation "wherein a signal for controlling the pressure of the cathode gas is once slightly decreased at an initial stage of increasing the air flow amount and thereafter it is increased following an increase of the cathode gas flow amount" is indefinite because it is unclear with respect to what reference point the signal for controlling the pressure of the cathode is once slightly decreased.

The term "slightly decreased" in claim 10 is a relative term which renders the claim indefinite. The term "slightly decreased" is not defined by the claim, the specification does not

provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Merritt et al. (US 5,366,821).

In general, Merritt et al. disclose a method and apparatus for providing a substantially constant output voltage from a fuel cell notwithstanding output current variations (see abstract). The reference is concerned with providing a substantially constant voltage even when its load current varies (col. 4, lines 48-51) and optimizing the oxygen utilization ratio according to the transient power output of the fuel cell to improve efficiency (col. 3, lines 59-65).

Merritt et al. disclose a fuel cell system (see Figure 2) that comprises a fuel cell 10, which generates power to a variable load 152 by supplying anode gas 112, cathode gas 162 (air) into the fuel cell and a compressor 330 (see Figure 3) that controls the amount of air to be supplied into the cathode side of the fuel cell and a pressure control valve 180 (see Figure 4) *that controls* the air pressure of the fuel cell and which is provided on downstream of the cathode side of the fuel cell (see abstract; col. 8, lines 38-44; col. 9, line 24 to col. 10, line 27; col. 11, line 32 to col. 12, line 45). The air flow controls means in the form of a flow calculator (see Figure 4) controls

the airflow toward the cathode inlet side to be a target airflow amount corresponding to the target power generation amount (the required pressure) of the fuel cell by controlling the speed of the compressor which controls the revolution number of the motor that drives the speed of the compressor (col. 9, lines 24-46; col. 11, lines 46-67 and col. 12, lines 1-44).

If the flow rate of the oxidant is to be increased during the transition period of the fuel cell, the desired mass flow rate is implemented and maintained by changing the size of the flow control valve 180 until the flow calculator 349 (the air pressure control means) determined that the desired mass flow has been achieved and any subsequent deviation from the desired mass flow rate is similarly detected at the mass flow transducer 358 and remedied by the flow calculator 340 through the command signal 389 to the flow control valve 180 (col. 10, lines 20-27). During the stationary state of the fuel cell, the mass flow rate of the reactant gas is regulated by the flow control valve 180 at the cathode gas output of the fuel cell and the flow calculator, which is responsive primarily to the fuel cell output current and secondarily to the mass flow rate measured at the cathode gas input, actuates the flow control valve 180 (col. 5, lines 60-68).

During a transition period of the fuel cell such as when the output current of the fuel cell has changed, the flow rate of the oxidant gas can be increased without decreasing its pressure and the variable-flow control valve 180 is opened until the transducer 358 detects that the desired mass flow rate has been obtained and since an uncompensated increase in the mass flow rate would be accompanied by a pressure drop, any resulting tendency toward a pressure drop will be met by increasing the speed of the motor 332 sufficiently to restore the set point pressure of the oxidant gas supply which changes the amount of air supplied by the compressor during the

transition period (col. 12, lines 1-25). As can be seen in this section of the reference, changing the opening of the valve during the transition period changes the pressure of the oxidant gas stream as well as the flow rate of the oxidant gas stream through the fuel cell. The speed or the revolution number of the compressor also inherently controls the amount of airflow into the cathode inlet side of the fuel cell because it pumps the air from an air source or supply into the cathode inlet side of the fuel cell.

After the motor 332 to the compressor is adjusted, the mass flow rate is again changed slightly as monitored by sensor 358 and the valve 180 is adjusted to restore the flow rate through the transducer 344 (col. 12, lines 25-28). Column 12, lines 25-28 of the reference clearly disclose changing the amount of cathode gas supplied to the fuel cell by the compressor during the transition period and thereafter changing the opening of the pressure control valve 180.

Hence it can be seen during the transition period of the fuel cell, the feedback steps of maintaining the flow amount of air to a prescribed value and a pressure of the air to a prescribed value are stopped while the system is being configured such that successive perturbations of the pressure control and mass flow control will be smaller and smaller (air pressure control means during the transition period is kept operating until the airflow amount reaches the target value and the air pressure control means during the transition period is kept operating until the airflow amount reaches the target air flow amount) and a new state of operation (the stationary state with no load current variation) at the new mass flow rate and the original pressure will be quickly achieved after the transition state is over (col. 12, lines 29-33).

Finally, as seen in Figure 1 of applicant's present specification, the flow valve 8A is located downstream of the cathode side of the fuel cell and the compressor 7B is located

upstream of the cathode side of the fuel cell. The flow valve 180 of Merritt is similarly located downstream of the cathode side of the fuel cell and the compressor 330 is located upstream of the cathode side of the fuel cell and both the flow valve 180 and compressor 330 inherently control the pressure and flow rate of the oxidant gas through the fuel cell as recited in the instant claims because the location of the flow valve 180 is identical to the location of the flow valve 8 A shown in Figure 1 of the present specification and the location of the compressor is identical to the location of the compressor 7B shown in Figure 1 of the present specification. Although the semantics of the Merritt et al. reference may be slightly differently from that claimed in the instant claims, the processes claimed are inherently disclosed by the fuel cell system of Merritt et al. when Figures 1-4 of Merritt are compared to Figure 1 of the present application as to the location of the flow valve downstream of the oxidant side of the fuel cell and the location of the compressor upstream of the oxidant side of the fuel cell.

Finally, the amount of power generated from the fuel cell is changed during the transition period as the gas flow amount to the cathode is gradually adjusted to the target value discussed above that is maintained during the new stationary state such that the power is not changed.

Response to Arguments

8. Applicant's arguments filed 7/13/2004 have been fully considered but they are not persuasive.

With respect to Merritt, applicant asserts that the reference does not teach or suggest controlling the cathode gas pressure depending on the cathode gas amount in a transition period

for the fuel cell and that the transition period is defined in the claim amendments as a period when an amount of power generated from the fuel cell changes. Applicant also asserts that Merritt does not disclose a period of operation corresponding to the transition period when the power generation amount varies because the Merritt fuel cell provides a constant output voltage which does not vary.

In response, the Merritt reference clearly disclose controlling the amount of cathode gas (air) supplied by a compressor during a transition period of the fuel cell due to current load variations that require more or less oxygen in the fuel cell and corresponding more or less output power which is directly related to the increase or decrease of the current of the electrical output of the fuel cell stack as measured by current transducer 362 (col. 10, lines 27-36). Even though the voltage is maintained to be substantially constant, the output current is not and therefore the output power is also varied due to variations in the current output. One of ordinary skill in the art is familiar with the power equation given by P (power) = V(voltage) x I (current).

Furthermore Merritt states the required mass flow rate of the oxidant gas through the stack 10 and thus through the mass flow transducer 358 is determined by the flow calculator which is primarily responsive to the current signal of the current transducer (col. 10, lines 1-5). Merritt also states that both the compressor and the valve 180 are used to set the new mass flow rate and maintaining a pressure after the transition period is over (col. 12, lines 1-28).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ Susy Tsang-Foster

Susy Tsang-Foster
Primary Examiner
Art Unit 1745